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Entomologist for April is one on "the survival of the fittest" among certain species of Pterostichus as deduced from their habits, in which Mr. J. Hamilton gives some facts bearing on the extinction of species of these ground-beetles in the vicinity of large cities. Of the sixteen species mentioned four must soon become extinct, and six may possibly exist in the future as rarities, four will occur not uncommonly, while two (*stygicus* and *lucublandus*) will remain as now, common.——Under the caption "La feuille qui se transforme en insecte," M. Preudhomme de Borre figures the larva of a singular mimetic form of Orthoptera (*Chæradodis rhombicollis* Latr.) from Quito, which is popularly supposed to change into a leaf.——*Zeitschrift für wissenschaftliche Zoologie*, for June 27, contains a lengthy article, with numerous illustrations, on the adhesive apparatus on the tarsal joints of insects, by G. Simmermacher, to which we shall again refer.——Mr. Hulst's monograph of the genus Catocala is apparently completed in the third number of the Bulletin of the Brooklyn Entomological Society. It contains a brief synopsis of the species, filling four closely printed pages; then follows synonyms and descriptions of the species, the latter rather too brief, but yet comparative. While the paper hardly fulfills the requirements of a monograph it is an excellent synopsis.——In his "Contributions a l'histoire des metamorphoses des Longicorns de la famille des Prionidæ," M. Aug. Lameere describes and figures the pupa of *Parandra polita* Say.——A case of development of the imago in an ichneumoned pupa is recorded in the *Entomologists' Monthly Magazine* for July, by A. F. Griffith, who, in a pupa of Tæniocampa, found that "the moth had apparently died, as so often happens, when just ready for emergence, but within the body was a parasite alive, also just ready to emerge."

ZOÖLOGY.

Structure of the Otocysts of Worms.—M. E. Jourdan's investigations were made upon the small Arenicolæ of the coast of Marseilles and in the laboratory of that place.

By sectioning the cephalic segment of an Arenicola previously fixed by the injection of a solution of osmic acid of 0.50 per cent, the auditory capsules were shown in some sections and easily recognized by their little calcareous corpuscles. The otocysts are situated in the thickness of the integuments, far from the hypodermis and in the midst of muscular bundles; they are fixed by the connective envelope of these bundles, which surrounds them. They are not in direct contact with the œsophageal commissures, but connected with them by several nerves. They are placed towards the dorsal surface.

The nerve fibers composing the commissure and the brain are very fine and striated longitudinally. Nerve-cells exist throughout the length of the commissure, some in its interior, but a much

greater number between the commissure and the hypodermis, often intimately connecting these two parts.

The otocysts are spherical. The diameter of their cavity is $\frac{11}{100}$ millim., and that of the sphere formed by the outer capsule $\frac{22}{100}$ millim. The thick walls consist of a layer of fusiform cells, a network of fibrillæ arranged in a dense plexus, and a connective envelope. The cells form the greater part of its thickness; they are very delicate, spindle-shaped, slightly inflated towards the middle, where the nucleus is situated; they also increase in thickness towards their inner extremity, where they are surmounted by a thick plate. The plates of all the cells are closely soldered together, forming a cuticle, which, in sections, is often detached from the cells which produced it. No layer of vibratile cilia was to be seen distinctly, but indications of them seemed to exist upon portions which had been long in osmic acid. The cells taper at their base and at the same time bend in different directions; and these basal prolongations anastomose and form a very delicate network of fibrillæ, which, by their union, constitute at the base of the epithelial layer a regular little zone, intermediate between the nerve-fibers and the foot of the cells; a few nuclei are distinguishable in it. This plexus rests against the connective envelope, which is formed by a thin and dense membrane, presenting perforations through which the basilar plexus enters into relations with the nerve-fibers.—*Comptes Rendus, March 24, 1884, p. 757.*

On the Pelagic Fauna of the Swiss Lakes — Dr. O. E. Imhof gives a brief summary of the investigations hitherto made in the Swiss lakes, from which it appears that up to the present time there have been found more entomostraca than true pelagic animals. He then describes the results of his own researches upon several of the lakes. He has found nine new representatives of the pelagic fauna, of microscopic dimensions it is true, but, like the crustacea, represented by a great number of individuals.

Dr. Imhof characterizes the true pelagic forms by means of the following two principal remarks:

1. The animals which are truly pelagic from their birth to their death always swim freely in the water, never going either to the shore or to the bottom of the lake, and never touching the surface of the water, so as to avoid coming directly in contact with the atmospheric air.

2. The true pelagic animals carry their ova (with the exception of the winter egg) either attached to the exterior of the body or in a sort of incubatory cavity until the young individual, whether immediately like its mother or subject to transformation, can quit the envelope of the egg or the incubatory cavity, and lead at once the mode of existence of an accomplished swimmer.

The author has studied the pelagic fauna of the following lakes:

Zurich, Zug, des Quatre, Contous, Egeri, Katzen, Greifen, Maggiore, Lugano, Como and Garda.—*Bibl. Univ., Arch. des Sci., October 15, 1883, p. 349,* and *Journ. Roy. Micr. Soc., April, 1884.*

THE "MAN-EATER SHARK," *Carcharodon carcharias* (Fig. 1 and Plate XXXI).—The various descriptions given of this species are so very imperfect and confusing that it is safe to say, with Professor D. S. Jordan in a recent letter to me, "There is no good description of the animal extant. The earlier writers spoke of it without knowing it, and all had more or less confusion between it and *C. lamna.*"

This shark was taken by me on the fourth day of August, 1883, about two miles off Great Point lighthouse, Nantucket, Mass.

The experienced fishermen of Nantucket, with all their oppor-

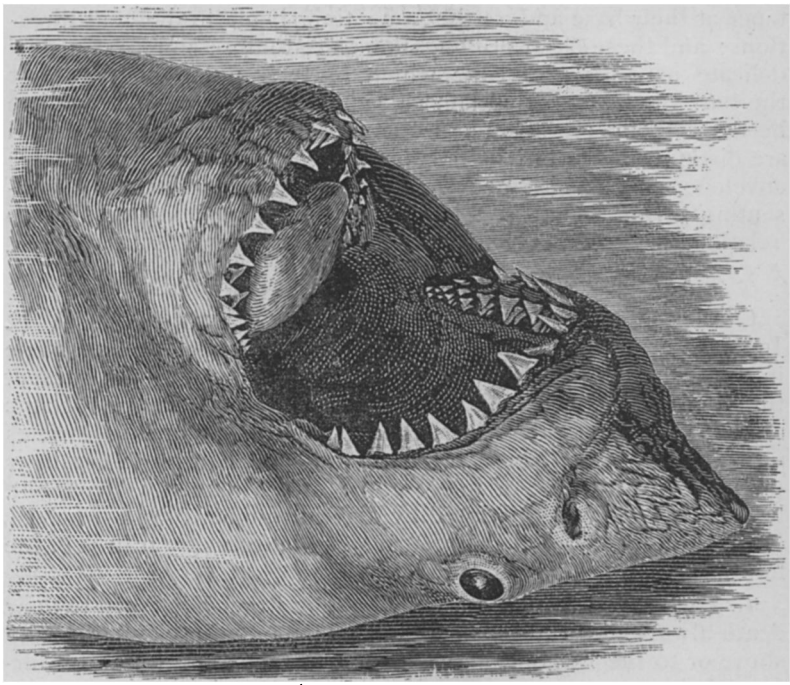


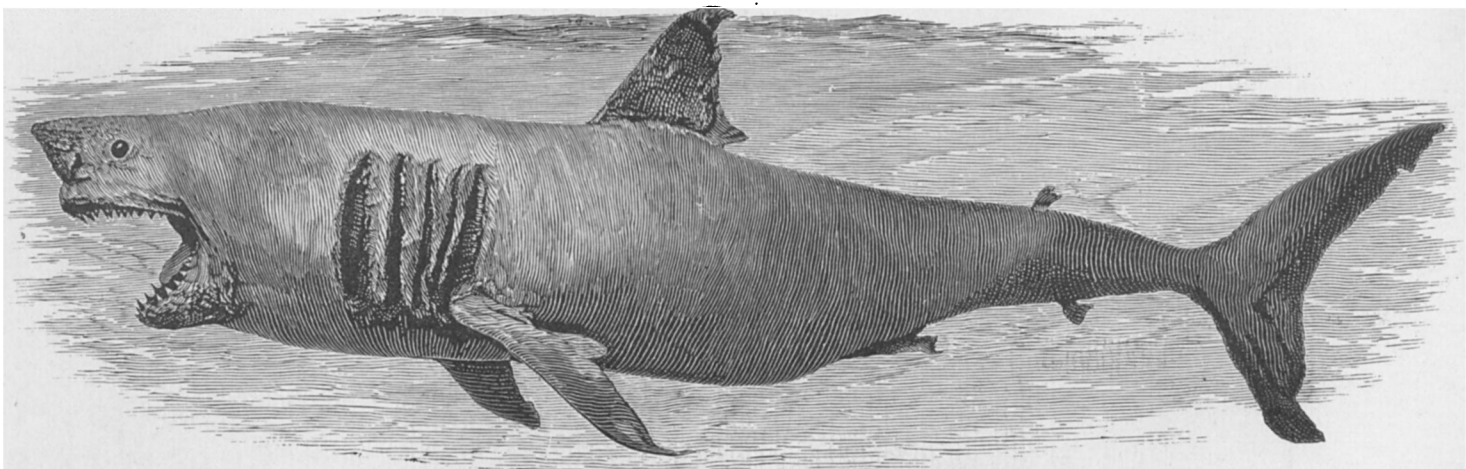
FIG. 1.—The Man-eater Shark; position of attack.

tunities for investigating this interesting family of fishes, were ignorant of the correct name of this specimen, and they regarded it as a rare species in the waters of that vicinity. It therefore became to me an object of special interest and study.

The specimen which gives me the data for this note, I have placed in the museum of Vassar Brothers' Institute in this city.[1]

[1] A full description appears in the Proceedings of the American Philosophical Society of July 18, 1884.

PLATE XXXI.



The Man-eater Shark. From a photograph.

The accompanying cuts are taken from photographs. — *W. D. Stevenson, M.D., Poughkeepsie, N. Y.*

WATER-PORES OF THE LAMELLIBRANCH FOOT.—H. Griesbach has maintained the existence of *pori aquiferi* in the lamellibranch foot, while J. Carrière held the contrary view. J. T. Cattie has studied a considerable number of species, and does not find the least trace of aquiferous pores; and F. Barrois arrives at the same results. He discusses the work of Carrière and himself, and finds that they have studied most of the forms where the presence of aquiferous pores has been claimed, and in every case finds pores absent, or in such position that it seems they are either connected with the functional byssogenous organ, or, where such is absent in the adult, with the remnant of the same. Barrois sums up his views thus: "No pores exist for the introduction of water into the circulation; the only pores of the foot are those connected with the byssus organ, which never communicates with the interior of the foot. The blood may have water introduced into it, but this may be effected by osmosis, or in some manner not discussed."— *Journal Royal Microscopical Society, April.*

TWO SPECIES OF MANATEE IN BRAZIL.—The mammals collected by Natterer, the Brazilian traveler and naturalist, are being worked out by A. von Pelzeln, two parts of his memoir having, according to a notice in *Nature*, appeared of the Sirenia. Natterer met with a manatee high up the stream of the Amazons, in the Rio Negro, Rio Brancho, and Madeira, and maintains in his notes that the species which inhabits these far inland waters is quite different from the *Manatus americanus* of the South American coast. Natterer called it *Manatus inunguis*, from its nailless fingers, and sent home to the Imperial Cabinet of Vienna three complete specimens and several skulls of the animal. Natterer also met with two species of dolphin in the Amazons and its tributaries.

ABNORMAL FOOD OF CATS.—Strange as it may seem, little has been published upon the abnormal appetites acquired by many of our domestic animals. A moment's thought shows that all the cooked food and the milk which cats obtain in considerable quantity in a tamed state could never have formed any part of the food of their wild ancestors, while fresh fish, the food which few cats can resist the temptation of stealing, would be eaten but rarely by cats which were obliged to capture the fish for themselves, although I have seen a manx (or so-called tailless) cat bring home fishes, even eels, which she had the courage to capture in shallow pools of the tail-race of a saw-mill when the mill was stopped.

From the natural food of cats, the flesh of vertebrates, one might readily expect them to catch and eat insects. Adolph Müller mentions[1] that his cat regularly hunted at twilight the

[1] Zool. garten, Aug., 1880, jahrg. 21, pp. 253–54.

moths, chiefly Noctuidæ, in his garden. About 1870 I had a cat that, nearly every hot afternoon in summer and autumn, caught grasshoppers (Caloptenus and Oedipoda), and brought me her insect captures alive before eating them, with as much pride as if she had taken mice or birds. During the past summer I noticed several cats capture and eat beetles of the genera Lachnosterna and Prionus; the odor of the beetles of the latter genus seems sufficiently pungent and repulsive to drive away cats, since they dislike most pungent odors, but I have seen two cats that apparently regarded Prionus a delicacy, for they would eat dead, mutilated, sometimes half-decayed beetles of this genus, which they found about the yard.

Tempted by the butter or other kinds of fat upon mashed potatoes, or by the meat mixed with the potatoes in certain sorts of hash, the domestic cat has learned to eat potatoes, but most cats dislike them; cats have been in similar ways forced into accepting bread, but it still remains true that the majority of well-fed cats will reject bread unless buttered or soaked in milk. Still the cat likes a few peculiar flavors; their extreme passion for catnip (*Nepeta cataria*), and their fondness for valerian (Valeriana), have been long since observed and noted. Kleberg says[1] that the cat likes golden bread, *i. e.*, a bread flavored with saffron and spices; that it likes ginger-bread, rose-water rolls, and raisins. I have seen several cats that ate raisins, and one cat that would eat raisins, peanut-candy, lumps of sugar, figs, and nearly all kinds of nuts, but this cat was an especial pet and tasted of almost everything which its mistress ate, eating some of her food when the flavor did not prove too disagreeable.

Last summer I was greatly surprised, however, knowing the antipathy which cats generally have to amylaceous food, to find that my cat often would eat cooked green corn in preference to beefsteak. When especially anxious for corn he eats not only the corn from the cob, but the softer portions of the cob itself, although he likes best to have the corn cut from the cob for him. The idea naturally suggested itself at first that the butter on the corn led him to eat it, but he eats it greedily without butter, and often has made a hearty dinner of from one-half to a whole ear of corn, while meat remained on his plate untouched. Raw corn is not very acceptable to him, although sometimes eaten; for this farmers should be thankful, since if the feline appetite for raw corn was as good as it is for cooked corn the cats might attack cornfields, eat the corn from the ears, and thus become a serious foe to agriculture.

The belief that corn-eating was an individual peculiarity of my cat was soon dispelled by experiments with a number of other cats, all of which ate green corn with equal readiness. Further

[1] Zool. garten, July, 1878, jahrg. 19, pp. 211–213.

experiments showed that brown-bread, johnny-cake, and pastry made chiefly of Indian meal, are eaten readily by cats, and that oat-meal, in its different forms, is more agreeable to them than is food which consists mostly of wheat flour. This appetite for corn explained why I had seen, a number of years ago, two half-wild kittens stealing daily the uncooked meal mixed with water and given to chickens, and it shed light on the reason for the peculiar avidity with which some cats feed upon popcorn. I had previously attributed the appetite which cats have for popcorn to the preference that they exhibit for crisp food, for food that crackles while being chewed.

It would be entertaining and instructive if some one would take advantage of the cat-shows which are held now and then in our large cities, where a considerable number of pet cats are collected together, and write out a series of notes on the strange appetites acquired by the feline race from its intimacy with man. Statements should be based upon actual experiments made in each case by the writer, and not upon the assertions of the owners of the cats. The percentage of cats that would eat corn, raisins, candy, and other substances not ordinarily eaten by cats, could be determined readily in that way.—*George Dimmock, Cambridge, Mass., March 14, 1884.*

Zoological Notes.—*Infusorians.*—Dr. A. C. Stokes describes in the *American Journal of Science* for July, several new species of infusorians from fresh water taken from the sediment at the bottom of an aquarium. *Loxodes vorax* Stokes was observed to make a choice in its food. Of the new genus Apgaria, three new species are described; of the new genus Ileonema a new species, and of the new genus Solenotus, two species are described; all are figured.

Cœlenterata.—M. Bedot has investigated the nature of the organ usually called a liver, situated between the two lamellæ that form the pneumatocyst of Velella. The principal part of the organ consists of a mass of cnidoblasts. Above this mass of cnidoblasts is a layer of small tubes closely packed together, and containing cellules, some of which are black or dark green. The less closely placed canals below the mass of cnidoblasts have but few dark grains. M. Bedot believes that this organ is that which forms the cnidoblasts, and he finds in the lower lamella of the floor of the pneumatocyst numerous openings, by which the stinging cells find their way into the ectoderm. If any part of the organ subserves the purpose of a liver, it can only be the superior portion in which the dark cellules occur.——W. K. Brooks (loc. cit.) contributes some notes upon the larval forms of *Turritopsis nutricula*, *Cunina octonaria*, *Nemopsis bachei*, *Phortis gibbosa*, and *Amphinema apicatum*, as observed at Beaufort, N. C. The first of these remains attached to the stem for some time after

the rupture of the perisarc, and has, when set free, eight tentacles, a thin globular bell, and a simple proboscis. In examples two weeks old, the stomach is suspended some distance below the sub-umbrella by a transparent mass of large cells, and the lower surface of the wide velum is pushed out to form eight hemispherical pouches, four perradial and four interradial. *C. octonaria*, as stated by McCrady, lives in its young state as a parasite within the bell of Turritopsis. The medusa of *N. bachei* L. Ag., is derived from a fixed hydroid closely related to Bougainvillea and Eudendrium. In the simplest stage of the medusa there are four tentacles, but others bud from the same points, forming clusters. In *P. gibbosa* the medusæ escape, one at at a time, from a gonotheca containing three or four. The apical process in Amphinema is not present in the larval medusa, but commences to develop on the third day.

Worms. — A recently issued part of Semper's "Reisen im Archipel der Philippinin" contains an account of the Sipunculids by Drs. De Man, Bulow and Selenka. Seven colored plates accompany the text.——A magnificent atlas of the Rhabdocœlida, containing twenty highly finished and colored folio plates, has been issued by Dr. L. von Graff, to accompany his extensive monograph of the Turbellaria, the first part of which contains descriptions of 259 species of Rhabdocœlida.——The otocysts of *Arenicola grubii*, according to M. Et. Jourdain, are situated on the dorsal aspect in the midst of muscular fibers, and are fixed by their conjunctive envelope, which is prolonged over them and surrounds them. They are not in immediate contact with the œsophagean commissures, but are simply united to them by several nerves.

Mollusks.—Sowerby's "Thesaurus conchyliorum" has reached its forty-second part. The last issue contains monographs of Teredo and Kupheo, Gastrochæna, Fistulana, Saxicava, the Pteropoda, and numerous other genera, including Tridacna and Hippopus, the varieties of which are very fully figured.——Henri Drouet (Bailliere, Paris), has put forth a monograph of the Unionidæ of Italy, which comprise forty-three forms of Unio, six of Microcondylus, and thirty-one of Anodonta. The basin of the Po and Upper Italy is one of the richest districts in Europe with respect to this family.

Arachnids.—At a recent meeting of the Academie Royale des Sciences of Belgium, M. MacLeod gave a preliminary communication upon the anatomy of Trombidium, Argas, Hydrachna and Gamasus. The suckers of the two first genera differ considerably; it has been proved that a communication exists in Trombidium between the stomach and the terminal intestine; a powerful muscle has been found to be attached to the supposed poison glands in that genus, and the course of the excretory canals of the salivary glands has been followed. Certain granules contained in the terminal intestine of Argas are formed in special

tubes which present much analogy to the Malpighian canals of the Araneidæ described by Plateau.

Crustaceans.—E. A. Birge (Stud. from the Biol. Lab. J. Hopk. Univ., 1883), describes and figures various stages in the development of *Panopæus sayi.* The zoea moults a large number of times. In the change to the megalops stage all trace of the long spines is lost. In this it differs from Cancer, in which the megalops retains the dorsal and frontal spines. The last megalops stage is reached after at least four moultings.

Birds.—The osteology of the kingfisher (*Ceryle alcyon*) is described and well figured by Dr. Shufeldt in the *Journal of Anatomy and Physiology*, XVIII, 279. After touching upon the general characteristics of kingfishers, their distribution, mode of life, and the views of the leading authorities upon their taxonomy, he then examines the skeletons. The account is rendered a comparative one, as Alcedo is compared with Ceryle, and sometimes with Geococcyx and Coccyzus.

Mammals.—M. A. Milne-Edwards announces the discovery of a new species of Hydropotes, called by M. Hende *H. argyropus.* It is a native of Corea, and differs from *H. inermis* in the lighter color of its hair, and in some cranial characters.

PHYSIOLOGY.[1]

BIOLOGICAL ACTION OF THE SALTS CONTAINED IN SEA WATER ON THE EXISTENCE OF MARINE ANIMALS.—An essay on this subject by H. A. Coutance, has been translated and published in the last report of the U. S. Commissioner of Fish and Fisheries. Marine animals are organisms of excessive sensibility, and in their distribution are dependent on the composition of the salt water, the nature and quantity of the gases dissolved, and the temperature, force and operation of the currents. M. Coutance experimented on the common mussel, the *Venus decussata*, the common periwinkle, and the whelk, *Buccinum undatum.*

By reason of their different organization these mollusks gave very different results. The bivalves which could shut themselves up between their valves, as a general rule, showed greater resistance than the univalves. Of these the periwinkle, whose operculum can close entirely, prudently retired into the remotest coils of the spiral, and were thus better protected than the buccins, whose opening does not shut tightly, and into which the water can easily enter by the canal at the mouth of the shell.

Salts of potash seem much less favorable than the salts of magnesia, and especially than salts of soda. Life ceased first in the ioduret, the bromide, the chloride, and the sulphate of potassium, and in solution No. 10, the prevailing element of which is chloride of potassium.

[1] This department is edited by Professor HENRY SEWALL, of Ann Arbor, Michigan.